

Memorandum on the Fortress of Gibraltar.

In compliance with instructions, I visited the fortress of Gibraltar and carefully inspected its defences between the 27th November and 4th December, having been received most courteously by His Excellency General Lord Napier of Magdala, who, with Colonel Gallwey, the Commanding Royal Engineer, and his Staff, gave me every possible assistance.

It is needless to enlarge upon the importance to Great Britain of this fortress; but it seems desirable to recall the uses which, in the event of war, it will serve. These uses are of two kinds, positive and negative.

1st. Positive. (a.) It is a point of observation at the entrance of the Mediterranean, from which, with the assistance of light, fast vessels, the movements of ships of war, and commercial ships, through the Straits might be observed, and information obtained thereof.

(b.) A small naval force stationed thereat, and deriving protection from the fortress, might close the passage of the Straits to any but the most powerful ships, or to squadrons of overpowering strength; and thus to a certain extent prevent the junction of a fleet from the Atlantic with one in the Mediterranean. It would thus for instance tend to obstruct the concentration of the French fleet in either sea; or that of any power in the Atlantic with that of a maritime power in the Mediterranean.

(c.) It will serve as a port of refuge to ships of war, or merchant ships, if hard pressed by an enemy's cruisers either in the Atlantic or Mediterranean; and is therefore a valuable link in the communications with India and the Cape of Good Hope, and through the Mediterranean, with the Suez Canal.

(d.) It is of use as a Coaling Station and for slight refits.

2nd. Negative. Its occupation by Great Britain precludes its being used by any foreign power for any of the above purposes as opposed to British interests.

The use of Gibraltar for the four first named positive purposes depends upon the capacity of the dockyard, and port, and upon the stores within it and upon the protection afforded to them by the works of defence; and for the last or negative, upon its powers of resistance in case of attack.

The bay of Gibraltar affords a good and capacious anchorage for a very large fleet; but inasmuch as a considerable proportion of the heavy armour-piercing guns mounted for its defence are at no great elevation above the sea, and are distributed along its length, some understanding appears necessary by which, when the bay is not occupied by a fleet of such power as to preclude the possibility of attack, a space shall be prescribed within which ships seeking the shelter of the fortress shall anchor so as not to interfere with the fire of the batteries. I cannot learn that this question has been considered by the Naval and Military authorities in conjunction.

One great defect in this fortress, which in its present state must limit its use to a certain extent if Great Britain should be at war with a power possessing, and capable of keeping, the sea with ships mounting very heavy guns, is that there is no inlet in the shore within which ships can seek shelter; and as a consequence these ships must always be nearer to the enemy's ships than the latter are to the guns of the fortress.

In the absence of naval means of defence, therefore, which in war will probably be the normal state of the fortress, hostile ships—if protected by thicker armour than the guns of the fortress can pierce, and armed with guns of equal power with those of the fortress—may lie off in comparative safety beyond the effective range of the batteries, and commit serious havoc among shipping the construction of which is not such as to resist their fire, unless

that shipping is protected by adequate defensive works. It may also insult the fortress, and even seriously injure the batteries constructed for its defence. If such ships should carry heavier guns than those mounted in the fortress, these results may be produced with greater certainty and effect.

The heaviest guns at present mounted on the works at Gibraltar are 10-inch 18-ton guns and 9-inch 12-ton guns; there being 18 of the former, and 20 of the latter. Six 12-inch 38-ton guns have been approved, but the emplacements for mounting them will not be all completed before the end of the present year.

On my journey homewards from Malta I visited Naples, where, having a letter of introduction to the Admiral Superintendent, I was received with great kindness by him, and was shown over the Dockyard in which was lying the armoured ship the "Duillio." The Italian Government were pressing her completion to the utmost, men being employed upon her night and day every day of the week to get her ready to leave Naples on the 31st of December for Spezia, where she was to be completed by the attachment of her armour plates, and was to receive her armament, the whole of which I was informed had arrived in readiness for her.

Her armament is to consist of four 100-ton guns in two turrets so placed that she can bring all her guns to bear in any direction; the battery and machinery for working the guns being protected by plates 22 inches in thickness.

I was informed that this ship, which is stated to be capable of steaming 14 knots per hour under full steam, and 11 knots under moderate steam, will be completed and ready for service in three or four months, as also her sister ship the "Durando," and that the Italian Government are building two more ships of still larger dimensions to carry a similar armament.

It is evident therefore that within a very short future the sea defences of the fortresses in the Mediterranean as well as elsewhere may be exposed to attack by heavily armoured ships, armed with guns of 100 tons weight, and firing projectiles, weighing nearly a ton, at the highest velocities; and it will be easily understood that such ships may be placed in positions where, while comparatively secure themselves, they may not only injure the shipping in the port, but also commit serious havoc within the fortress. It is desirable that these considerations should have their due weight in determining the extent to which the military and commercial navies of the country can expect to make use of the port in time of war; and also in determining the necessity of additional measures to be taken for increasing its utility.

Before entering upon the measures to be taken for this purpose, I would remark that the opinion expressed by Sir J. Burgoyne in 1848 that "The outer line (of defence of Gibraltar) is of prodigious strength," is as true now as it was then, notwithstanding the development of the means of attack which has taken place. The improvements in the means of defence are such that with an adequate garrison, well provisioned and commanded, with due vigilance, proper precautions against surprise, and energy in its defence, and subject to some improvements hereafter to be detailed, Gibraltar ought to be impregnable whether by land or sea. While holding this opinion, however, it will be seen that although it affords protection to shipping against capture, it will not in its present condition secure them against injury and possible destruction; also that it is exposed to insult from the fire of enemies' ships which—ranging along its front in comparative safety—may injure the sea batteries and throw shot and shell into the town, which, extending as it does from the water-side up the lower slopes of the rock, is necessarily and unavoidably exposed to injury of this nature.

First, then, it appears desirable that immediate steps should be taken by the Admiralty to thicken the parapet wall of the New Mole. At present the New Mole is the great depot for coals, which are piled on it with a wall on the outer, or exposed, side of very moderate thickness, so much so that unarmoured ships, transports, &c., lying alongside the Mole within it would be liable to have their hulls pierced by shot from seaward.

It appears desirable therefore that, as strongly recommended by the Defence Committee in 1867, the wall should be thickened so as to afford a perfect protection from fire from the westward.

The armament with 38-ton guns, as approved, is being proceeded with as

fast as the work, which is limited by the number of available hands, can be pressed on; but it is absolutely necessary that some heavier guns than these should be mounted in as advanced positions as possible if the positive advantages to be derived from the possession of Gibraltar are to be secured in war. A shoal is stated to exist to the northward of the New Mole in a favourable position for two of the heaviest guns, which should possess sufficient power to pierce the armoured citadels of ships of the Duillio class at a range of at least 3,000 yards and be placed there in an armoured turret. This would be an expensive work, but its value cannot be overstated.

It is also desirable that a few fast torpedo boats should be attached permanently to the station, which, acting offensively, might considerably embarrass the action of any ship in the offing. These are specially required pending the mounting of the heavier guns above referred to; the preparation for which, if authorized, will require a considerable time.

These measures would tend greatly to the security of the port, but it would still be exposed to fire from batteries which may be thrown up in Spanish territory within 4,000 yards, as observed by Sir John Burgoyne.

To meet this danger the Defence Committee recommended that a pier should be run out from Ragged Staff at right angles to the existing Mole, but the development of artillery fire has been such that this pier would not afford efficient protection for shipping within it. A pier could not be constructed of such a height as to protect more than the hulls of ships lying close under it, and it would afford no protection to the Dockyard buildings from fire from the land, nor to ships lying alongside the existing Mole. Ships also lying under it would be terribly exposed to fire from the westward. I would here refer to an observation made by Sir John Burgoyne, that Rosia Bay is above 400 yards further off, and, not being visible, could not be so effectually annoyed by fire from the land side, and it would, therefore, be advisable to get as much service from it as its capability will admit, and he points out in what way it might be greatly improved for the naval service. On this subject I would add that in the event of the establishment of batteries on the main land to the north, Rosia Bay would afford so much greater security than the New Mole, that its employment for ships would be almost imperative. It is no doubt small, and cannot therefore be used for general purposes. It is also not better protected from seaward than the space within the New Mole, but there is ample depth of water within it; and, as under the possible contingency of an attack by land as well as by sea, it would become by far the most secure position for ships calling at Gibraltar, it is well worthy of consideration whether the moderate outlay required for its improvement would not be well worth making.

It may be observed here that the Admiralty quarrying operations at Little Bay, having been carried out as far as is consistent with the defence of this part of the works, these operations should be discontinued, and any stone that may be required in future should be obtained from the scarp at the north point.

The defence of the harbour and roadstead would also be materially assisted by the heavy guns (9-inch 12-ton) in the Rock Casemates at Devil's Gap and Queen's Road, placed at intervals ranging from 400 to 600 feet above the sea. These guns would play effectively over the ships and batteries below them, bringing a plunging fire on the decks of ships. They are a small mark for an enemy, require no iron for their protection, and could scarcely, under any circumstances, be silenced.

Doubts having been expressed whether the guns in these casemates can be fired without inflicting damage to the town, and with safety to the gun detachments, the Royal Engineers, in deference to the opinion of others, have suspended work upon them since 1872.

Through the courtesy of Lord Napier I had an opportunity of witnessing practice from Nos. 1 and 2 guns in the Calpe Rock casemates, which, so far as the casemates were concerned, was very successful, the smoke clearing away with rapidity; no buildings were injured, and the casemates themselves were not shaken by the concussion.

Three casemates at Calpe are complete, two being armed. I recommend that the third be armed, and that two commenced five years ago at Queen's Road, and one at Devil's Gap, be completed.

The state of armoured batteries for the heavy rifled guns which have been mounted is not altogether satisfactory; it is to be regretted that the armour plates and merlons are not stronger. These works, which were made of sufficient

strength to resist the heaviest artillery contemplated at the time of their construction, and in general use at the present time on board ships of war, are not capable of resisting the guns now being introduced in foreign navies. Some additional protection to the merlons and expense ammunition rooms is necessary; but the present condition of these batteries is a further, and very strong, argument for the provision of the heavier guns before referred to.

Some of these batteries also are designed to receive temporary splinter-proof cover of timber and concrete. This cover should at once be made. If left until the time of necessity arises it will take much time in preparation, will probably be imperfectly done, and the work when done will only last a few years. For these reasons I recommend that the work should be of a permanent nature in iron and concrete.

The works for the 38-ton guns which have been approved are proceeding satisfactorily. There is one other point on the sea defences to which immediate attention requires to be directed. None of the heavy guns at present mounted command the water at the head of the Bay, which is accessible to vessels of 14 feet draught. It will therefore be advisable to mount two heavy guns (18-ton guns would answer) to prevent gunboats from taking up positions in this direction. The northern end of King's Lines and King's Place of Arms appear to present favourable positions for these guns, where they would be secure from fire from the land side. Another similar gun on a disappearing carriage on the Old Mole would also be most valuable.

Having thus touched upon the sea defences, I must now draw attention to the highly dangerous condition of some of the powder magazines, in consequence of their exposed positions, and their inadequate protection from the fire of the heavy guns of the present day.

Attention having been drawn to this subject by the Governor, in his Confidential Report of the 7th May last, a letter was written requesting him to report what measures he would propose to adopt in the event of this country being involved in war, to place the stores of powder in security, making use of such galleries and rock casemates as may be suitable, and performing such necessary work in them as may be required.

On the 13th August, a reply was received stating the measures that could be extemporized with this view; but the condition of the magazines is so dangerous that, before leaving Gibraltar, I wrote a letter to Lord Napier (copy annexed), requesting him to call upon the Commanding Royal Engineer for a special report on the subject, as also on the improvement of the lightning conductors, which are defective.

The quantity of powder stored in these magazines (exclusive of expense magazines), being intended for the supply of Her Majesty's fleet, as well as of the garrison, is very large,—nearly 30,000 barrels; the position of every magazine is well known to Foreign Powers, the officers of whose ships have free access to every part of the Rock, and are assisted in their examination of the works by the wretched system, in vogue almost from time immemorial, of painting the appropriation on all doors of public buildings. The magazines, therefore, are peculiarly liable to destruction, and as the defence of the fortress must depend to a great extent on the supply of ammunition, the very important service of placing it in security does not admit of delay.

My attention was also directed to the question of water supply, upon which the capability of the fortress to hold out may also depend. Under late arrangements, approved by Order in Council in 1865, the whole water supply for the garrison, as well as for the civil population, has been handed over to the Sanitary Commissioners, who are a body of civilians selected from owners, or tenants, of premises at Gibraltar of the annual rateable value of 100 dollars.

It is to be regretted, from a military point of view, that the supply of the water in so important a garrison has not been retained in the hands of the military authorities. The whole subject, however, of the duties performed by the Sanitary Commissioners has been under consideration of the Secretary of State for the Colonies, and a special report has been made by Lieut.-Colonel Ponsonby Cox, R.E., one of the Inspectors under the Local Government Board, who was specially sent from England by the Colonial Office for this purpose.

It appears that the whole of the tanks which belonged to the War Depart-

ment, and were formerly supplied from catch water surfaces, have been handed over to this Board; and although they have not been increased to any appreciable extent,* they are now used for the supply of the civil population numbering 17,000 souls as well as of the garrison. This would not be objectionable if the supply were certain at all times, and if it were not for the special condition consequent upon the colony being within a fortress which is liable to attack.

These tanks are at present supplied by pumping from wells about 1,000 yards outside the fortress on the spit of sand which unites the rock of Gibraltar to the mainland of Spain. The position of these wells so far outside the lines of defence is a very serious mistake from a military point of view; as the supply would be liable to be cut off in the event of hostilities, and the pumping station would certainly be destroyed. It may be argued that no great harm would accrue if the tanks are kept full at all times, as the garrison would be no worse off than if dependent solely upon the rainfall, provided the catch water surfaces are properly maintained, and the civil population are compelled to provide ample storage for water on their own premises. This latter however is a measure which it would be difficult to enforce. I have therefore suggested to Lord Napier that periodical inspections should be made, under his Lordship's directions, by the Commanding Royal Engineer, of the tanks and catch water surfaces, and a report made as to their condition; and further, that measures should be considered for placing the garrison and inhabitants on a limited allowance in case of necessity.

This however is but a precarious expedient, and does not insure that ample supply which might be necessary in the event of war, and as the existing supply is of inferior quality, I would strongly urge that a boring should be made without loss of time, as recommended by Professor Ramsay in 1875, to ascertain whether a better and more certain supply cannot be obtained from geological strata at a greater depth than has been yet tried; this boring should be made near to and under the protection of the fortress.

Under the present constitution of the colony this work would have to be done by the Sanitary Commissioners, but a question of such vital importance does not admit of delay.

In connection with this subject it must be remembered that Gibraltar is also required to supply water to the ships of Her Majesty's fleet, for which purpose large tanks are maintained by the Admiralty. This however does not insure a certain supply to the ships under all circumstances, as in case of necessity the garrison and inhabitants might be compelled to indent upon the naval supply, irrespective of the purpose for which it was stored.

One of the principal tanks, containing 3,000,000 gallons, also has a serious defect; its supporting wall is so exposed to fire that a single shot might cause the total loss of the important supply stored up in it.

Failing a supply from the proposed boring, it might be necessary to fit up condensers in a place of security, to utilize the water of the sea in case of necessity.

I would also observe that by the constitution of the Sanitary Commission the War Department are not represented on that body, although they contribute one-third to the rates levied by them, and it was brought to my knowledge that the price charged for water which is consumed at a much larger rate, nearly three times as great, per head by the garrison than by the Civil population, is fixed so high—2s. 6d. per 1,000 gallons—that a very large profit is derived from it, which by reducing the rates for other services casts an undue burden upon the War Department. However the water may be supplied, it ought I conceive on economical grounds to be distributed at or about cost price, without any large profits; and that any funds required for other purposes should be levied for the specific objects to which they are applied. To guard the interests of the War Department in this respect it would appear advisable that it should be represented on the Sanitary Board, with reference to the proportion of its contributions to the rates.

Notwithstanding the great strength of Gibraltar, there are some other points in its defence which appear to require attention. With regard to the south end of the Rock, Sir John Burgoyne says, "it is not to be conceived

* Sir J. Burgoyne recommended an increase of tank accommodation.

how such a position is to be forced against even a small force of defenders and ordinary conduct."

With respect to the defences extending along the sea front northwards from the New Mole, he observes "that the breakwater in front of the sea line is a most valuable defence." There can be no doubt that this breakwater, by imposing a direct obstacle to boats approaching the ramparts, is an obstruction which with the improved means of defence of the present day, and notably breech-loading small arms, will make any attempt at escalade, if fairly opposed, altogether impossible.

The defences on the North, or land, front are very strong, as from the great height of the Rock escarpments an attack can only be made along the narrow front of 310 yards between the sea and Forbes' battery, of which all but 80 yards are occupied by an inundation; and even this point of attack can only be approached by troops who have passed the narrow neck of land, which for a space of 1,500 yards is completely exposed to a plunging fire from the numerous batteries at different elevations on the Rock, and affords no cover whatever beyond what can be made artificially.

After reaching this neck any further advance would have to be made along the narrow causeways on either side of the inundation for a distance of 400 yards.

Strong, however, as this front is, it appears to require modification. Batteries could be established on Spanish territory beyond the neutral ground, where a considerable amount of natural cover is to be found within 2,000 yards of the fortress, which would take in reverse and in flank the sea defences all along to the New Mole, would bring a heavy fire on to the sea within the Mole itself, make the barracks in the Casemate Square almost untenable, and bombard the most populous parts of the town, in which are all the public buildings and principal stores. With a view to reducing the risks from an attack of this nature, which, if combined with a sea attack, would cause very serious losses to the garrison and put their powers of endurance to a severe test, it will be advisable to remodel the grand battery, with reference to which I requested Lord Napier to obtain a report from the Commanding Royal Engineer, and to remodel the Old Mole, so that one half of the guns shall fire over the ground in front of the north face, and the other half flank the sea front by closing the embrasures, reducing the number of guns, and erecting traverses. In effecting these alterations it is desirable that over-bank or disappearing carriages should be employed, for which cover should be provided when not actually required for use. A proposal is under consideration for revising the armament of this front, which, when decided, should be carried out at once.

Some attention to the road of approach from Spain is also necessary. The guard-house is weak, and should be replaced by a small defensible building, without which offensive action on the plain beyond would be almost impossible. The necessity of this work is much insisted upon (p. 27) by Sir John Burgoyne in his report of 1848. He says "the situation should decidedly be taken up by a respectable self-defensible building, which need only be small."

The requirements are:

"1. That it should be able to contain a picket of one officer and 25 men, with all conveniences to permit of their being closely shut up in security for a day or two, though probably it would only be required night by night.

"2. That it should be thoroughly bomb-proof, and *entirely* covered from the isthmus by a glacis, as there is no necessity for its presenting any front in that direction.

"3. That it be self-defensible, by two small flanking turrets at least at opposite angles, with loopholes for musketry."

These recommendations of Sir John Burgoyne should in the main be carried out. The inundation should be cleaned and deepened where necessary, and cuts formed in it and across the road out into the sea. The material obtained in clearing the inundation might with advantage be spread over the north front.

The Governor, Lord Napier, proposes to remove by degrees all permanent buildings from the outside of this front. This is a most judicious measure which should be carried out as rapidly as possible. The abattoirs for the civil and military population, and stables for the stock of live animals always main-

tained on the north front, outside the walls of the fortress, are most offensive. They pollute the ground from which the supply of water is at present derived, and should be removed at once. They have the very grave defect that in the event of war they would assuredly be ruined at the outbreak of hostilities, being exposed to the close fire of ships at the back of the rock, where there are no guns for their protection. There would, therefore, be great risk of the supply of fresh meat being lost to the garrison; and one of the first necessities, in the event of war, would be to bring the cattle into as secure a position as could be selected within the fortress, for which no provision has been made.

The best course, therefore, would be to make an establishment for the animals if a suitable site can be found, which does not appear impossible, on the Europa Heights, which, while being in comparative security from fire shall insure to the garrison the use of any supply which may be collected for them.

While on the subject of the North Front, I may also mention that the only cemetery for the whole Colony is in the sandy plain from which the present water supply is derived. This must lead to the eventual pollution of the supply, and unless the boring before recommended be successful some new arrangement should be made by which the practice of burying the dead in this objectionable position may be dispensed with.

Secure better accommodation is also requisite for the commissariat stores and bakeries, forage, transport animals, and for the perishable articles of reserve stores.

The Commissariat Establishment is most defective; it is only partially bomb-proof, is close behind the line wall where most exposed to an enemy's fire, and it houses under one roof the main stock of flour, corn, barley and salt pork.

It contains the meat for the next day's supply; and the ovens and malting stores are in the same premises: the forage and chopped straw being placed above the latter. If a fire broke out in this establishment, there would be scarcely a chance of putting it out, or confining it to the premises, which are surrounded by other buildings close to them; and the whole, or nearly the whole of the victuals for the garrison would be destroyed. The ovens also are barely sufficient for the supply of the garrison; the whole of them together being only adequate to bake bread for one day; so that the failure of any one from being out of repair causes inconvenience, or recourse being had to field ovens. Bad as the arrangement of the Commissariat Establishment is, it is needlessly rendered worse by being mixed up with the Store Establishment; the clerks of the latter occupying as offices an intermediate floor between the salt pork and flour stores, so that the pork in being lifted to the upper store passes through the office.

These stores should be rendered bomb-proof, more ovens should be provided, and the forage should be removed. The Ordnance Store Office should be placed elsewhere.

A steam mill should be provided, when a large quantity of the materials for bread might be kept in grain, which is less liable to injury by keeping than flour.

The transport stables and muleteers' quarters are close at hand, in confined and ill-ventilated buildings, and should be removed, without delay, to a more secure and airy position. This is advisable on sanitary grounds, both for the health of the garrison and civil population. Such a position may be found near the Engineer Yard, as recommended by the Board of which Lieut.-General Somerset was President; and the steam-mill and bakeries may also be placed there in security. Sand Pits Magazine, when given up, will provide a certain amount of storage.

The ordnance stores are mainly collected in the Grand Store. This is an excellent store, though much exposed, and not bomb-proof.

Here, too, the Commissariat and Ordnance Store Establishments are mixed up; and this building shelters, in the midst of the ordnance stores, the Commissariat Offices and the Commissariat Chest. This embarrassing mixture of the two departments is a legacy of the Control Department. When that department was formed, it absorbed both Commissariat and Store Departments, the administration being common to both; but, upon its decease, the two departments again came into existence, when the Control Office, from the

accidental circumstance of the senior Control Officer having been in, and reverting to, the Commissariat, was retained as the head-quarter Commissariat Office, and the two divisional Control Offices became the Ordnance Store, and the subdivisional Commissariat Offices.

The Board, of which Lieut.-General Somerset was President, recommends that this building should be converted into a barrack, and that the Ordnance should be provided for in part by appropriating to them the Grand Magazine, now proposed to be no longer used as a magazine; by using for store purposes the two buildings at Rosia—one permanent, used as quarters for the Royal Artillery, for which it is not well adapted; and one temporary, used as married quarters, for which it is quite unsuitable; and lastly, by using the store at the New Mole.

This may meet present requirements, but some new store buildings should be erected near the latter place.

In examining the Commissariat and Ordnance Store Establishments, the policy of concentrating in one building the whole, or a major portion, of the stores of a department, forces itself upon consideration.

Gibraltar is not a very large place, but, nevertheless, much time is occupied in transit from one place to another, and it may, for some reasons, be more convenient to subdivide the stores of each nature; the main reason being that the loss of one establishment—an event which might easily happen during an attack—would not cause the paralysis of the department. The destruction of important stores may even endanger the safety of the garrison.

If, however, the establishments are made thoroughly secure against an enemy's fire, apprehension in this respect is much diminished, and the question need only be considered with reference to economy and facility of distribution.

Additional accommodation is also wanted for the garrison. The natural formation of the ground within the fortress, which rapidly rises from the sea level, is such that it is almost impossible to cover the buildings from direct fire from seaward, and therefore as the barracks are for the most part exposed to such fire in the present condition of the fortress, which, as before stated, is liable to insult from ships in the offing, the greater part of them would have to be vacated in time of war, and the troops lodged in the Rock Galleries, in the casemates in the line wall, and in extemporized cover under its protection.

Some of the casemates in the line wall require thickening on their exposed ends, to make them more secure; and it is very desirable, with a view to utilizing the casemates to the utmost, that the range known as the Waterport Casemates, which have been lent to the Colonial Government for bonded stores, should revert to their original purpose. The occupation of these casemates as bonded stores is also objectionable, because, being close to the entrance into the fortress from Spain, they afford a position in which a large body of men may possibly be concealed with a view to a surprise. Sir John Burgoyne considered that the greatest danger to which the fortress is exposed, is that of being surprised either by disaffected inhabitants of the place, or by enemies introduced under the guise of traders from the country. The number of persons who daily enter from Spain is about 4,000, and the large proportion of the 17,000 civil inhabitants being also Spaniards, it is evident that this is a danger to guard against which the greatest vigilance is necessary.

Considering also the very exposed position of the town, and the impossibility of placing the inhabitants in security from the effects of bombardment, it will be a necessity, on the outbreak of war, to remove the greater part of them, at any rate the women, children, and infirm persons from the fortress. Meanwhile every exertion should be made to prevent the increase of the population by placing obstacles in the way of the erection of new buildings, and of the colonization of new settlers, otherwise the system adopted in the Franco-German war, of reducing towns by bombarding the civil population in their residences, might be attempted, which, with so large a population crowded into the small area of about, 75 acres, 226 persons per acre, as dense as that of the most crowded parts of London, would put the powers of endurance of the garrison and general in command to a very severe test. In the French war these tactics were most successful, and brought about the surrender of several fortified towns.

As stated by the board, of which Lieut.-General Somerset was President, the accommodation of the barrack rooms at present within the fortress, exclusive therefore of the North Front Hutment, 258 men, and Catalan Bay,

50 men, is for 3,937 non-commissioned officers and men, while the actual number, according to the establishments of the troops now in the garrison, is 4,932. It is evident, therefore, that a considerable increase is nearly as necessary now to prevent overcrowding, as when it was insisted upon by the Commissioners who reported on the sanitary condition of the barracks in 1863.

The Board recommend that this deficient accommodation should be supplied partly by re-appropriation and partly by the construction of new buildings, as follows:—

1. The "Grand Store," in Southport Street to be re-appropriated, and fitted up as a barrack for single men.
2. That additional barracks be built for 90 men in Moorish Castle.
3. For 64 single and 12 married men at Harding's Fort.
4. That sundry accessory buildings be constructed and alterations made.

The recommendations of the Board are based upon a partial redistribution of the garrison, by which four batteries of Royal Artillery are allotted to the north, and three batteries to the south district, the Infantry battalions remaining as at present, two in the north and three in the south district.

As the southern defences are stronger, and less liable to attack than those in the northern district, and, as in the latter the guns are more numerous, it would seem that the distribution of the Infantry battalions—though very suitable during peace—is not such as would be made in time of siege. Unless siege were commenced without warning the garrison should be augmented by about 2,000 men, to bring it up to the strength recommended by Sir John Burgoyne—viz., 7,000 men, and the augmenting battalions would find shelter in the galleries and covered places in the north district, especially on the North Front. On these grounds, and as the sites for barracks on the South Front, being out of the town, are more airy and healthy, the proposed distribution is, I think, judicious, and the recommendation of the Board should be concurred in. The estimate of the cost involved in carrying out these recommendations is approximate only, and would have to be carefully considered in detail. For the present purpose, however, it may be accepted as correct.

Some little attention is requisite to the communications and gateways, and a tramway should be established in the rear of the Line Wall. Electric lights also should be provided.

The present condition of Gibraltar may be summed up as follows:—

It is in a position to secure the negative advantage of preventing it from being seized by any other power, and used against the interests of Great Britain; but it does not secure the positive advantages which it did in former days before the introduction of steam for purposes of navigation, and of heavy artillery with armoured ships.

It is therefore absolutely necessary, *if these advantages are to be secured*, that a few guns of the heaviest calibre should be placed in advanced positions to keep ships at a distance from the port and its defences.

The expense of performing this and other services will amount approximately to 400,000*l.*, which it is to be observed does not nearly come up to the cost of a single ironclad ship of war. It is however a far larger sum than there would appear to be any probability of obtaining upon the estimates annually voted by Parliament; and does not include the proposed additions to the armament, nor the cost of torpedo boats, or of thickening the parapet wall of the New Mole.

I would therefore strongly urge the advisability of providing for these services by including them in a loan which has been urged as necessary for the defence of the coaling stations abroad, and the principal commercial harbours at home. A further reason for adopting this course is that there must always be constant demands upon the annual estimates for keeping the various fortresses of the empire up to the requirements of the day, consequent on the continually progressive improvements of the means of attack and defence; and the urgent necessity, which cannot long be postponed, for very extensive reconstruction of hut-barracks, which are rapidly becoming so bad that they may be expected ere long seriously to affect the comfort of the troops, and with them the prospects of recruiting and of maintaining the army in a state of efficiency.

J. L. A. SIMMONS, *General,*
Inspector-General of Fortifications.

23rd January 1878.

Copy.

My Lord,

Gibraltar, 3rd December 1877.

Having inspected the works in the fortress of Gibraltar, I would suggest for your Lordship's consideration that the Commanding Royal Engineer should be desired to report on the following points:—

1. On the condition of the lightning conductors on every magazine in the Fortress; several of which, in the course of my inspection, I found defective.

2. The magazines generally are so ill-protected from fire that each should be made the subject of especial study with a view to rendering them secure, where practicable, from direct fire; or, if this cannot be done satisfactorily, to replace them by others in secure positions.

The reserve magazine on Windmill Hill appears to be capable of being strengthened on its exposed sides. The Grand Magazine is so exposed that there is no alternative other than recommended by the Board, of which Lieut.-General Somerset was President,—viz., to abandon it as a magazine and appropriate it for some other purpose. The same observation applies to Willis' Magazine, and the Magazine in Prince's Lines.

It is desirable, in accordance with the views of your Lordship that the reserve ammunition in these magazines should be stored, if practicable, in spaces excavated in the solid rock. Several sites have been suggested; but I should be glad if the Commanding Royal Engineer were directed to report on the most eligible way of carrying out the service with the least possible delay, and at as moderate cost as practicable.

3. With regard to the Water Supply, your Lordship is of opinion that the tanks should be kept full, and the catch-water surfaces in thorough repair. Although they are under the control of the Sanitary Commissioners I would suggest that, considering the vast importance of the water supply to the fortress, inspections should be made under the direction of the Commanding Royal Engineer at such periods as your Lordship may direct, and a certified report sent to your Lordship as to their condition.

4. As the capability of the fortress to hold out against attack may depend upon the water supply, I would also suggest that measures should be considered for placing the garrison and inhabitants on a limited allowance in case of necessity.

5. I find the large tank on the Europa Main Road containing 3,000,000 gallons is not protected against fire; so that a single shot might cause a total loss of this important supply of water. It is under the charge of the Sanitary Commissioners; but it is most desirable that a report should be made as to the best means of securing the water in it from loss from this cause. The same remark applies to the South Barrack tank, containing 340,000 gallons, which is under charge of the Admiralty.

6. I should also be glad if your Lordship would call upon the Commanding Royal Engineer, for a plan and estimate for remodelling the Grand Battery and constructing a *parados* at the back, covered with earth, which shall afford protection from reverse fire from the land side to the casemate barracks as well as to the battery: also for such protection as could be obtained by remodelling Montagu Bastion.

I have &c.,
J. L. A. SIMMONS,
General.

His Excellency Lord Napier of Magdala, G.C.B.
Governor and Commander-in-Chief,
Gibraltar.